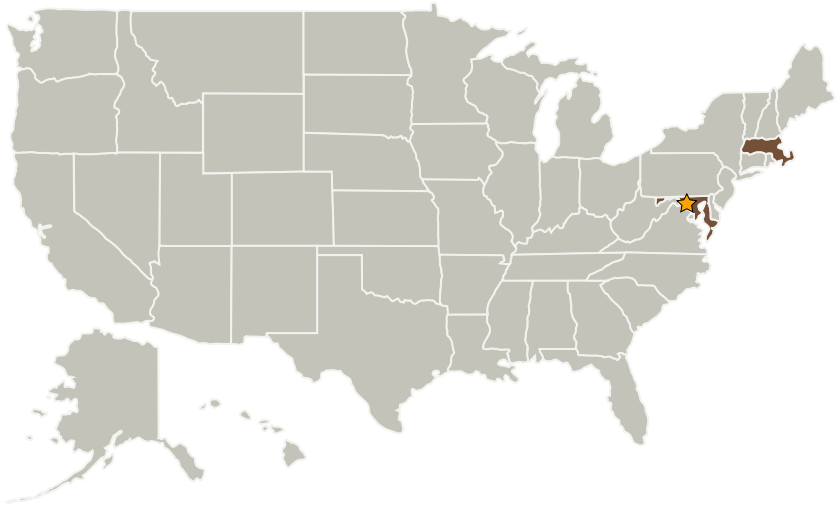
Miniaturized MMIC-Based Millimeter-Wave Frequency Synthesizers for Space Applications, Phase I

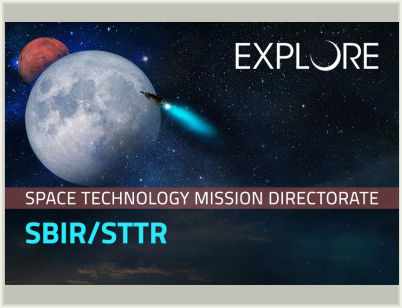
Completed Technology Project (2005 - 2005)

Project Introduction

MMIC technology provides the technology base to reduce the size and weight of microwave and millimeter wave (MMW) equipment on board airborne and space-based platforms. Signal sources at MMW frequencies, however, have not been available in MMIC form widely. Hittite has developed a family of MMIC products to implement complete phase-locked synthesizers in using MMIC and mixed-signal ICs and demonstrated miniaturized frequency synthesizers representing size reduction of several orders of magnitude without sacrificing performance. Based on recent success in demonstration of critical MMICs and ICs, Hittite proposes to apply its novel MMIC concept to design MMW signal sources for application in earth monitoring sensors. Two different synthesizer architecture, one direct and one indirect, are proposed as candidate approaches. In both cases, frequency synthesis will take place at about 1/8 of the output frequency and then translated up to the final output with a fixed tone. The proposed approach relies on components operating at lower frequencies for better phase noise performance, and the method is applicable to generation of higher frequencies. The proposed program will lead to a family of novel miniaturized MMIC products for commercial communications.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael Koechlin

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.7 Innovative RF Technologies